CITY OF LODI

COUNCIL COMMUNICATION

AGENDA TITLE: Specifications and Advertisement for Bids for #2/0 15kV Primary Underground Conductor

MEETING DATE: November 17, 1999

PREPARED BY: Electric Utility Director

RECOMMENDED ACTION: Staff recommends that the City Council approve the specifications and authorize advertisement for bids for 20,000 feet of #2/0 15KV concentric neutral primary underground conductor.

BACKGROUND INFORMATION: A portion of this bid amount will be used to provide new service to the Lodi West #8 and Richards Ranch subdivisions.

The balance of the requirement will be placed into inventory to cover future projects scheduled during the estimated 18-20 week delivery leadtime.

FUNDING: Electric Utility Department Operating Fund, Page E-25
Estimated Cost: $23,000

BID OPENING: December 1, 1999

Alan N. Vallow, Electric Utility Director

Prepared by Joel Harris, Purchasing Officer

cc: Manager, Electric Utility Engineering and Operations

APPROVED: _____
H. Dixon Flynn – City Manager

15KV_CC1

11/05/99

City of Lodi
Equipment Specification

15 kV, TR-XLPE INSULATED, CONCENTRIC NEUTRAL CABLE

1.0 GENERAL

Cable furnished under these specifications shall be limited to 15 kV single conductor URD cable, stranded aluminum conductor, filled strand, triple extruded insulating system consisting of a thermosetting conductor shield, high dielectric strength tree-retardant cross-linked polyethylene insulation, thermosetting semiconducting insulation shield, bare copper concentric neutral and longitudinally water blocking under the encapsulating jacket. The cable shall be suitable for 90 degrees C continuous and 130 degrees C emergency operating temperature. The cable shall be designed for installation in ducts or for direct burial in earth, in wet or dry locations. Cable furnished shall meet the requirements of the applicable NEMA, ICEA, AEIC and ASTM Standards, latest edition thereof, unless otherwise noted in this Specification.

2.0 CONDUCTOR

The insulated conductor shall be Class B, stranded or compressed strand 1350 aluminum alloy, three-quarter hard meeting the requirements of ASTM B231, B609. Conductor size will be listed on the proposal forms (bid sheets).

3.0 STRAND FILLING COMPOUND

In order to prevent water propagation through the insulated conductor and to alleviate water (electrochemical) treeing of the insulation, a strand filling compound shall completely fill the voids between the conductor's inner strand layer(s). The compound used shall be flexible and stable under the operating conditions imposed on the cable and as specified herein, and compatible with the conductor, strand shield and insulation. The outer surface of the conductor shall be free from the filling compound such that splices and terminations can be readily applied using standard compression-type connectors and utilizing the same techniques as for unfilled conductors.

4.0 CONDUCTOR SHIELD

The conductor (strand) shielding shall be an extruded virgin black semi-conducting thermosetting polyethylene. The material shall be compatible with the conductor metal and free stripping from the stranded conductor. The extruded shield shall meet AEIC CS5-94 Standard, Table D-1, for minimum point thickness. The outer surface of the conductor shield shall be cylindrical and shall be firmly bonded to the overlaying insulation.

The contact area between the insulation and conductor shield shall not exhibit protrusions or irregularities which extends from the cylindrical surface of the conductor shield by more than 3 mils toward the insulation. Similarly, protrusions or irregularities shall not extend more than 7 mils into the shield.

5.0 INSULATION

Insulation shall be unfilled, semi-transparent, tree-retardant, cross-linked thermosetting polyethylene extruded directly over the conductor shield. The average insulation thickness shall not be less than 220 mils and the minimum thickness shall not be less than 90% of this value.

6.0 INSULATION SHIELD

The insulation shielding shall be an extruded virgin black semi-conducting thermosetting polyethylene. The thermosetting material shall be compatible with the insulation and the overlying metallic shield. The insulation shield compound and thickness shall be in conformance with AEIC CS5-94 Standard.

The contact area between the insulation and the insulation shield shall not exhibit projections or irregularities which extend toward or away from the cylindrical insulation and insulation shield interface by more than 10 mils.

The insulation shield shall strip cleanly from the insulation, leaving it free of any significant residue of semi-conducting or other material, which would have to be removed prior to installation of splices or terminations.

7.0 ECCENTRICITY

The maximum eccentricity (Tmax - Tmin) limit as specified in AEIC CS5-94 shall not be exceeded.

8.0 CONSTRUCTION METHOD

Conductor shield, insulation and insulation shield shall be installed on the conductor using the "True-Triple" extruding, dry cure method.

9.0 CONCENTRIC NEUTRAL

The concentric neutral conductor shall be a number of round, annealed, bare copper wires helically wrapped around the cable. The wires shall be spaced equidistant from each other around the circumference of the cable with a length of lay to be not less than 6 or more than 10 times the cable diameter.

The size of the neutral wires shall be in the range of #14 to #9 AWG.

The number of neutral wires shall be sufficient to yield "FULL NEUTRAL" on #2 AWG cable and "1/3 NEUTRAL" on all other cable sizes.

10.0 LONGITUDINAL WATER BARRIER

A longitudinal water barrier shall be applied over and around the neutral wires. This barrier shall, when activated by the presence of water, prohibit the longitudinal movement of water at the neutral wire/jacket/insulation shield interface.

11.0 ENCAPSULATING JACKET

An extruded, encapsulating and insulating layer of linear, low density black polyethylene shall be applied over the concentric neutral wires in accordance with ICEA S-66-524. The minimum thickness of this encapsulating jacket over the concentric wires shall be as follows:

Conductor Size (AWG or kcmil)	Minimum Thickness (mils)
#2 and #2/0	50
750 and 1000	80

12.0 MARKINGS

The encapsulating jacket shall be marked by means of surface or indent print with the following information at intervals of not more than 2 feet:

1: Manufacturer and plant of manufacture.
2: Type and size of cable.
3: Type of insulation, thickness and insulation level.
4: Voltage rating.
5: Year of manufacture.
6: National Electric Safety Code "Lightning Bolt" symbol.
7: Footage markings in two foot increments.
(Beginning and ending footage numbers shall be indicated on a durable label attached to a flange of the reel).

13.0 TESTING AND GUARANTEE

Testing of cable shall be performed according to procedures set forth by ICEA, AEIC and ASTM Standards. Certified copies of pass/fail test results shall be supplied. Any cable found defective either upon inspection, testing or installation will be returned at the manufacturer's expense.

14.0 SPECIFIC REQUIREMENTS

Any conditional bid such as "subject to availability in stock" will be considered non responsive and will be rejected. Cable shall be furnished according to Table 1 below:

Conductor Size AWG or kcmil (No. of Strands)	Conc. Neutral Size	Material Phase (Neutral)	Insulation Thickness (mils)	NEMA Reel Code
#2 (7)	Full Neut.	Alum. (Cu.)	220	5832
#2/0 (19)	1/3 Neut.	Alum. (Cu.)	220	5832
750 (61)	1/3 Neut.	Alum. (Cu.)	220	7848
1000 (61)	1/3 Neut.	Alum. (Cu.)	220	7848

NOTE: Refer to proposal forms (bid sheets) for specific sizes and quantities.

15.0 REELS

1. Makeup and length:
   Reels shall be shipped with cable to their full maximum cable capacity.

2. Packaging:
   Reels containing 750 and 1000 kcmil cable shall have adequate protective covering across the flanges. Such covering shall consist of wood members from flange to flange covering the entire perimeter of the reel (lagging). The lagging shall be nailed to the flange perimeter and shall be further secured with at least two steel bands around the reel.
   Reels containing #2 and #2/0 AWG cable shall be paper wrapped only, i.e. lagging is not required.
   Each end of the cable shall be firmly secured to the reel.

3. Marking:
   Each reel shall be marked with two durable labels securely attached to each flange of the reel and plainly marked and stating:

   a: Destination.
   b: Purchaser's purchase order number.
   c: Shipping length of cable on reel.
   d: Weight of reel (tare weight).
   e: Weight of cable on reel.
   f: Type and size of conductor.
   g: Insulation type and thickness.
   h: Voltage rating.
   i: Manufacturer's identification number
   j: Beginning and ending footage numbers of cable on the reel.

16.0 SHIPPING

Cable ends shall be adequately sealed with a water seal type material and heat shrinkable end caps to prevent the ingress of moisture into the cable ends. Reels shall be shipped upright. All shipments shall be prepaid, F.O.B. Lodi, California.

17.0 MATERIAL SAFETY DATA SHEETS

Material Safety Data Sheets, for specific cable components which are considered hazardous, shall accompany each order. Three (3) copies shall be supplied at time of delivery.